

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : **2001-260251**

(43)Date of publication of application : **25.09.2001**

(51)Int.Cl.

B29D 30/46

(21)Application number : **2000-072838** (71)Applicant : **BRIDGESTONE CORP**

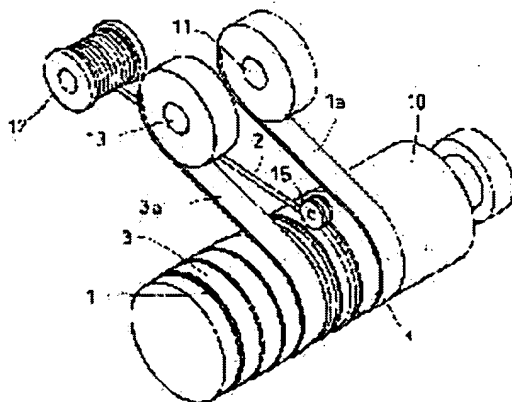
(22)Date of filing : **15.03.2000** (72)Inventor : **OGAWA YUICHIRO**

## (54) METHOD AND APPARATUS FOR MANUFACTURING PLY FOR TIRE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method and an apparatus not requiring much space for installation due to a small size of the apparatus, being excellent in productivity and enabling manufacture of a ply of high quality at a low cost.

SOLUTION: In the method for manufacturing the ply for a tire, a lower skim 1 is formed by winding a rubber ribbon spirally on a mandrel 10 in an overlapping manner, and a cord 2 is wound spirally on the lower skim 1. An upper skim 3 is formed by winding the rubber ribbon spirally on the lower skim 2 in the overlapping manner so that the cord 2 is held between them. The lower skim 1, the cord 2 and the upper skim 3 wound on the mandrel 10 to be integral are cut axially and spread out. Thereby the ply 5 is manufactured.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against  
examiner's decision of rejection]

[Date of extinction of right]

## CLAIMS

---

[Claim(s)]

[Claim 1] As it laps with a mandrel, twist a part of rubber ribbon around it spirally, and a bottom skim is formed. Twist a code spirally on said bottom skim, and on said bottom skim, on both sides of said code, as it laps, twist a part of rubber ribbon spirally, and an upper skim is formed. The manufacture approach of the ply for tires characterized by cutting the bottom skim which was twisted around said mandrel and was united, a code, and an upper skim to shaft orientations, developing, and manufacturing ply.

[Claim 2] A part of precedence rubber ribbon is made to lap with a mandrel. Spirally A cut water, It is behind and a part of backward rubber ribbon is made to lap [ on said precedence rubber ribbon ] a code on both sides of said code later than a cut water and a pan on said precedence rubber ribbon spirally. Spirally A cut water, A bottom skim, a code, and an upper skim are respectively formed in coincidence with said precedence rubber ribbon, a code, and a backward rubber ribbon. The manufacture approach of the ply for tires characterized by cutting the bottom skim which was twisted around said mandrel and was united, a code, and an upper skim to shaft orientations, developing, and manufacturing ply.

[Claim 3] The manufacturing installation of the ply for tires characterized by having the mandrel which carries out a rotation drive, a rubber ribbon supply means to supply while moving a rubber ribbon to shaft orientations at a mandrel, a code supply means to supply while moving a code to shaft orientations at a mandrel, and a cutting means to cut the bottom skim which was twisted around said mandrel and was united, a code, and an upper skim to shaft orientations.

[Claim 4] The manufacturing installation of the ply for tires characterized by having the mandrel which moves to shaft orientations while rotating, a rubber ribbon supply means to supply a rubber ribbon to a mandrel from a predetermined location, a code supply means to supply a code to a mandrel from a predetermined location, and a cutting means to cut the bottom skim which was twisted around said mandrel and was united, a code, and an upper skim to shaft orientations.

## DETAILED DESCRIPTION

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture approach of ply and manufacturing installation which are a tire configuration member.

[0002]

[Description of the Prior Art] Manufacture of ply had conventionally two kinds of methods of the mandrel method shown in the calender method shown in drawing 7 , and drawing 8 .

[0003] The calender method shown in drawing 7 is supplied so that two or more codes 01 may be pinched between the up-and-down calender roll 05 and 05, and it forms the band-like member 02 under which rubber was covered up and down and two or more codes 01 were laid.

[0004] And the cutter 06 of the downstream of calender rolls 05 and 05 cuts the band-like member 02 to predetermined die length, and ply 03 is manufactured. The manufactured ply 03 joins the both-ends edges 03a and 03b by molding drum lifting, and makes the shape of a cylinder, a belt member and a tread pile up further, and a raw tire is manufactured.

[0005] Moreover, the rubber sheet 013 which twists the rubber sheet 011 which becomes the mandrel 015 whose mandrel method shown in drawing 8 is a cylinder axis with a bottom skim, joins both ends in piles (refer to drawing 8 \*\*), then twists a code 012 spirally on a rubber sheet 011 (refer to drawing 8 \*\*), and serves as an upper skim in piles further on both sides of a code 012 on a rubber sheet 011 is twisted, and both ends are joined in piles (refer to drawing 8 \*\*).

[0006] And the bottom skim formed on the mandrel 015, a code, and the cylinder member which consists of an upper skim are cut to shaft orientations, it develops (refer to drawing 8 \*\*), and ply 010 is manufactured.

[0007]

[Problem(s) to be Solved by the Invention] While the calender of said calender method itself which manufactures the band-like member 02 of big width-of-face length is huge, its whole manufacturing installation is very large and facility cost starts, a large installation tooth space is also taken.

[0008] Moreover, in the case of said mandrel method, volume attachment of rubber sheets 011 and 013 serves as intermittent running, each both-ends joint of each rubber sheets 011 and 013 forms Stages 011a and 013a, and there are quality top problems, such as checking roundness, while productivity is bad.

[0009] This invention was made in view of this point, and an installation tooth space is not taken by the small manufacturing installation, but the place made into the purpose is excellent in productivity, and is in the point of offering the approach and equipment which can manufacture the ply of high quality by low cost.

[0010]

[Means for Solving the Problem and its Function and Effect] In order to attain the above-mentioned purpose, invention of this claim 1 publication As it laps with a mandrel, twist a part of rubber ribbon around it spirally, and a bottom skim is formed. Twist a code spirally on said bottom skim, and on said bottom skim, on both sides of said code, as it laps, twist a part of rubber ribbon spirally, and an upper skim is formed. It considered as the manufacture approach of the ply for tires which cuts the bottom skim which was twisted around said mandrel and was united, a code, and an upper skim to shaft orientations, develops, and manufactures ply.

[0011] Since ply is manufactured on a mandrel, the manufacturing installation itself is small, and an installation tooth space also has it, it ends, and can attain low cost-ization. [ small ] a bottom skim and an upper skim -- each -- the mandrel of a rubber ribbon --

twisting -- since it is formed, continuous running is possible, and while being able to raise productivity, a junction step like [ the manufactured ply ] before is not formed, but can maintain high quality.

[0012] A part of precedence rubber ribbon is made for invention according to claim 2 to lap with a mandrel. Spirally A cut water, It is behind and a part of backward rubber ribbon is made to lap [ on said precedence rubber ribbon ] a code on both sides of said code later than a cut water and a pan on said precedence rubber ribbon spirally. Spirally A cut water, It is the manufacture approach of the ply for tires which forms a bottom skim, a code, and an upper skim in coincidence respectively with said precedence rubber ribbon, a code, and a backward rubber ribbon, cuts the bottom skim which was twisted around said mandrel and was united, a code, and an upper skim to shaft orientations, develops, and manufactures ply.

[0013] Since the bottom skim, the code, and the upper skim are respectively formed in coincidence with the precedence rubber ribbon, the code, and the backward rubber ribbon, ply can be manufactured efficiently and productivity can be raised more. An installation tooth space is not taken by the small manufacturing installation, but the ply of high quality without a junction step can be manufactured by low cost.

[0014] Invention according to claim 3 is the manufacturing installation of the ply for tires equipped with the mandrel which carries out a rotation drive, a rubber ribbon supply means to supply while moving a rubber ribbon to shaft orientations at a mandrel, a code supply means to supply while moving a code to shaft orientations at a mandrel, and a cutting means to cut the bottom skim which was twisted around said mandrel and was united, a code, and an upper skim to shaft orientations.

[0015] By supplying a rubber ribbon, while a rubber ribbon supply means moves to shaft orientations at the mandrel to rotate A part of rubber ribbon can be spirally twisted around the periphery of a mandrel in piles, and a skim can be formed. A code can be similarly twisted spirally with a code supply means, it can form in piles in order of a bottom skim, a code, and an upper skim on a mandrel, and the ply for tires of high quality without a junction step can be efficiently manufactured by cutting to shaft orientations with a cutting means.

[0016] The rubber ribbon supply means for bottom skims and two rubber ribbon supply means for upper skims are prepared, by forming a bottom skim, a code, and an upper skim in coincidence respectively at coincidence using two sets of a code supply means and rubber ribbon supply means, ply can be manufactured more efficiently and productivity can be raised increasingly.

[0017] Invention according to claim 4 is the manufacturing installation of the ply for tires equipped with the mandrel which moves to shaft orientations while rotating, a rubber ribbon supply means to supply a rubber ribbon to a mandrel from a predetermined location, a code supply means to supply a code to a mandrel from a predetermined location, and a cutting means to cut the bottom skim which was twisted around said mandrel and was united, a code, and an upper skim to shaft orientations.

[0018] Because a rubber ribbon supply means supplies a rubber ribbon to the mandrel which moves to shaft orientations while rotating A part of rubber ribbon can be spirally twisted around the periphery of a mandrel in piles, and a skim can be formed. A code can be similarly twisted spirally with a code supply means, it can form in piles in order of a bottom skim, a code, and an upper skim on a mandrel, and the ply for tires of high quality

without a junction step can be efficiently manufactured by cutting to shaft orientations with a cutting means.

[0019] The rubber ribbon supply means for bottom skims and two rubber ribbon supply means for upper skims are prepared, by forming a bottom skim, a code, and an upper skim in coincidence respectively at coincidence using two sets of a code supply means and rubber ribbon supply means, ply can be manufactured more efficiently and productivity can be raised increasingly. Since what is necessary is for migration of shaft orientations to move only a mandrel to shaft orientations, and just to fix the rubber ribbon supply means and the code supply means to the orientation, equipment is simplified.

[0020]

[Embodiment of the Invention] The gestalt of the 1 operation which relates to this invention below is explained based on drawing 1 thru/or drawing 4 . As shown in drawing 1 , the precedence rubber ribbon supply roll 11 which supplies precedence rubber ribbon 1a to the perimeter of a mandrel 10 to rotate, the code supply roll 12 which supplies a code 2, and the backward rubber ribbon supply roll 13 which supplies backward rubber ribbon 3a are arranged in shaft orientations by shaft orientations movable together with this order.

[0021] The mandrel 10 which precedence rubber ribbon 1a rotates is supplied, from the precedence rubber ribbon supply roll 11 which moves to shaft orientations first, as it laps with a front face in part spirally, it coils around it, and the bottom skim 1 is formed gradually.

[0022] The mandrel 10 which a code 2 rotates from the code supply roll 12 which moves to shaft orientations later than supply of this precedence rubber ribbon 1a is supplied, and it coils spirally on the part of the bottom skim 1 which is positioned with the roll 15 with a slot which moves with the code supply roll 12, is forced, and has already been formed.

[0023] The mandrel 10 which backward rubber ribbon 3a rotates is supplied, from the backward rubber ribbon supply roll 13 which furthermore moves to shaft orientations later than supply of this code 2, on the part of the bottom skim 1 already formed, in between, on both sides of the code 2, as it laps in part spirally, it coils, and the upper skim 3 is formed gradually.

[0024] Drawing 1 shows the condition in the middle of precedence rubber ribbon 1a, a code 2, and backward rubber ribbon 3a being supplied to a mandrel 10, coiling around coincidence, and the upper skim 3 being formed on both sides of the bottom skim 1 and the code 2.

[0025] The sectional view in the middle of this formation is shown in drawing 2 . A code 2 coils around the part in which the bottom skim 1 is formed afterwards, it is further behind, and the upper skim 3 is lapped and formed on both sides of the code 2 in between.

[0026] In this way, it finishes winding in order of precedence rubber ribbon 1a, a code 2, and backward rubber ribbon 3a, and the bottom skim 1 as shown in drawing 3 , a code 2, and the cylinder member 4 that consists of an upper skim 3 are formed in a mandrel 10. There is no part like a junction step in this cylinder member 4 like before.

[0027] If a cutter 16 cuts this cylinder member 4 to shaft orientations and it develops, ply 5 will be manufactured as shown in drawing 4 . The manufactured ply 5 joins the both-ends edges 5a and 5b by molding drum lifting, and makes the shape of a cylinder (the code 2 directs in the direction of a medial axis of this cylinder), a belt member and a tread

pile up further, and a raw tire is manufactured.

[0028] Since the ply 5 of the gestalt of this operation is manufactured on a mandrel 10 as mentioned above, the manufacturing installation itself is small, and an installation tooth space also has it, it ends, and can attain low cost-ization. [ small ]

[0029] the bottom skim 1 and the upper skim 3 -- each -- the mandrel 10 of the rubber ribbons 1a and 3a -- twisting -- since it is formed, continuous running is carried out and productivity is high. A junction step like [ the manufactured ply 5 ] before is not formed, but can aim at improvement in quality.

[0030] Although the mandrel 10 did not move to shaft orientations only by rotating but moved the precedence rubber ribbon supply roll 11, the code supply roll 12, and the backward rubber ribbon supply roll 13 to shaft orientations with the gestalt of the above-mentioned implementation A mandrel 10 may be moved not only to rotation but to shaft orientations. The precedence rubber ribbon supply roll 11, the code supply roll 12, and the backward rubber ribbon supply roll 13 are fixed to an orientation by moving a mandrel 10 to shaft orientations. It can twist around a mandrel spirally only by supplying a rubber ribbon and a code, and a bottom skim and an upper skim can be formed.

[0031] Next, as the manufacture approach of ply, there is also an approach as shown in drawing 5 . That is, the bottom skim 21 may all be formed at a mandrel 10, as first shown in drawing 5 \*\*, a code 22 may be spirally twisted on the bottom skim 21 so that it may be shown subsequently to drawing 5 \*\*, and finally, as shown in drawing 5 \*\*, the upper skim 23 may be formed in piles.

[0032] Formation of the bottom skim 21 and formation of the upper skim 23 can be performed using the same rubber ribbon supply roll, and ply can be manufactured by few members.

[0033] In addition, two or more code supply rolls are arranged, and if two or more codes 32 are supplied to coincidence at a mandrel 10, and it twists on the bottom skim 31, as shown in drawing 6 , and the upper skim 33 is further twisted on it, the ply under which the code 32 with a pitch of about 1.5mm is laid, for example to the vertical rubber ribbon of about 10mm width of face can be manufactured.

Fig 1

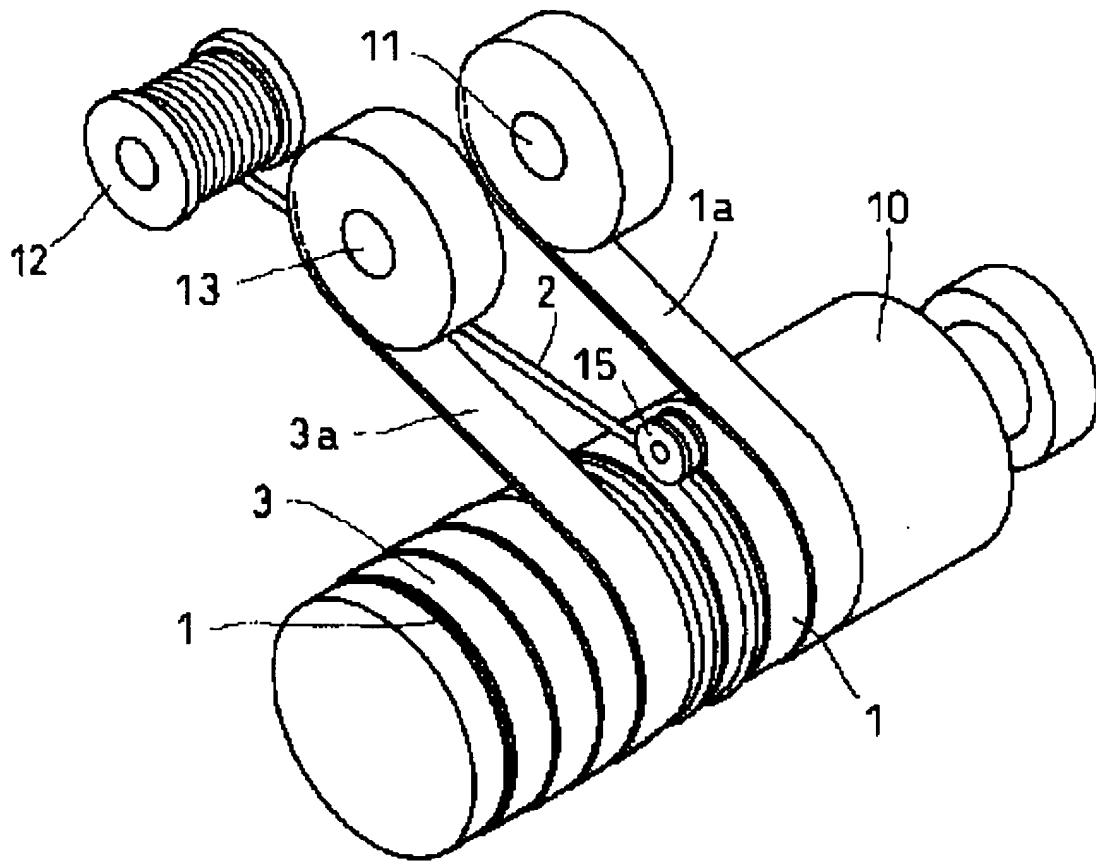


Fig 2

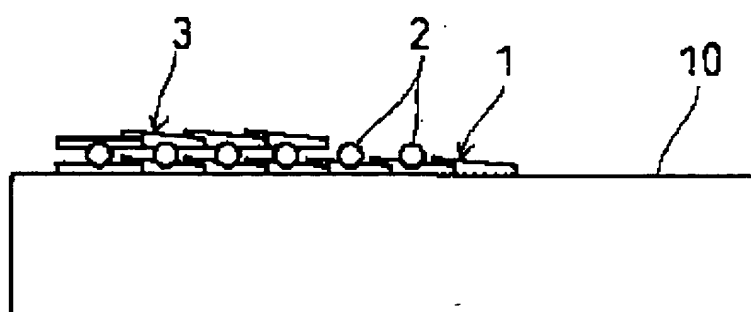


Fig 3

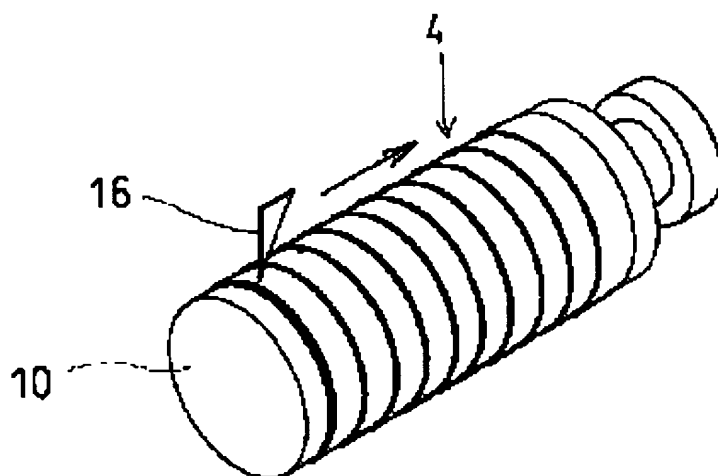




Fig 4

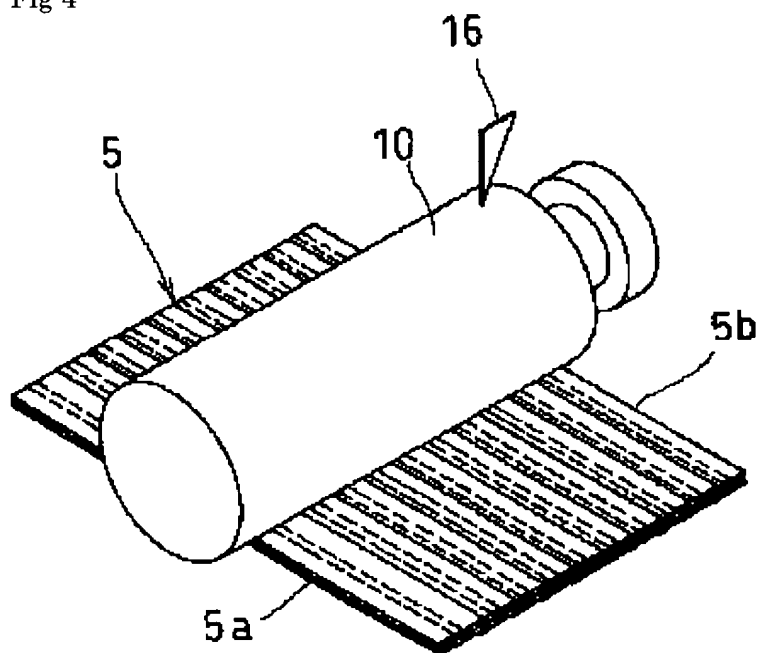


Fig 5

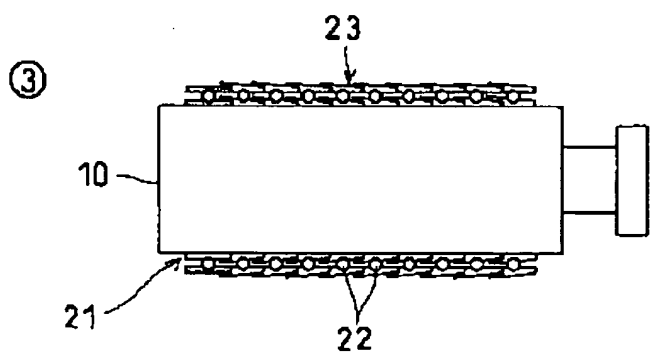
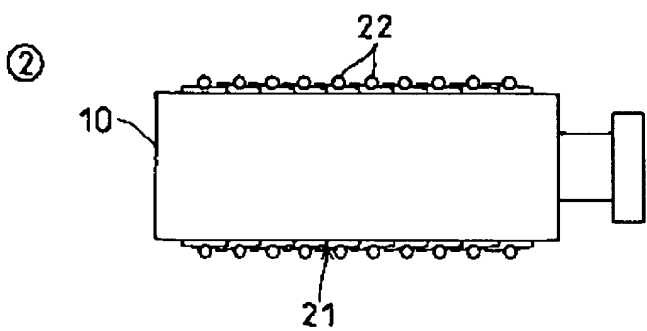
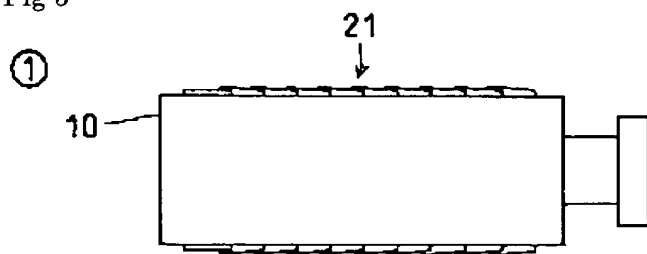


Fig. 6

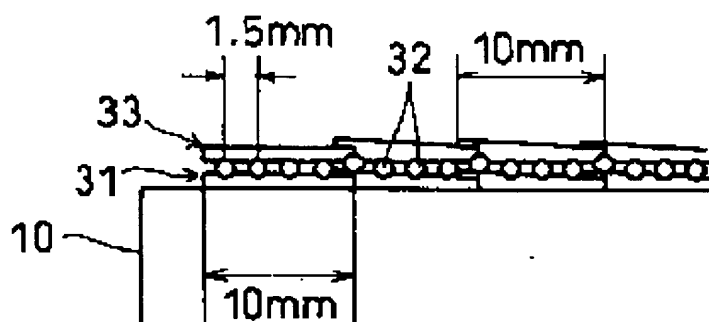
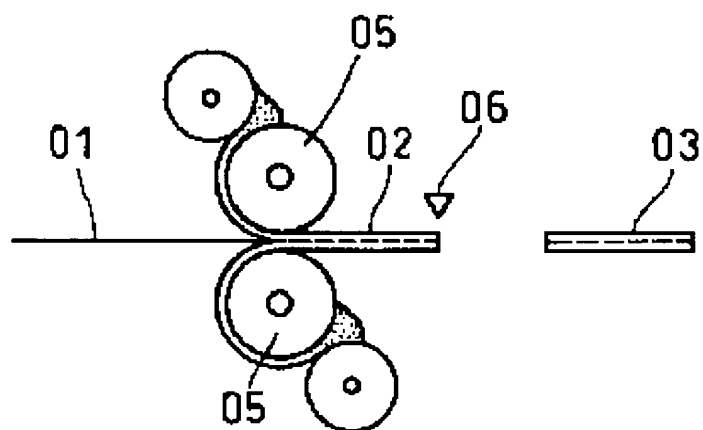


Fig 7

①



②

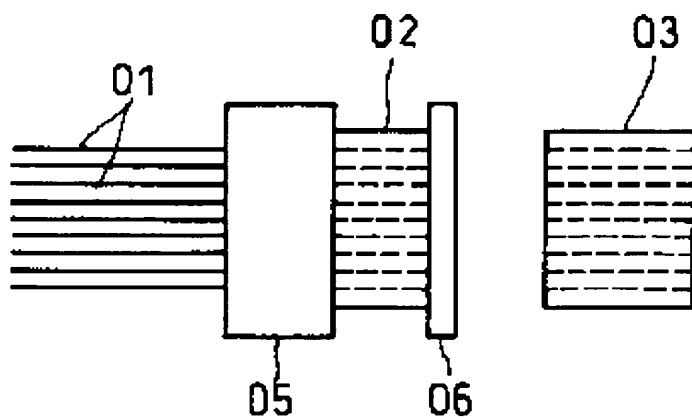
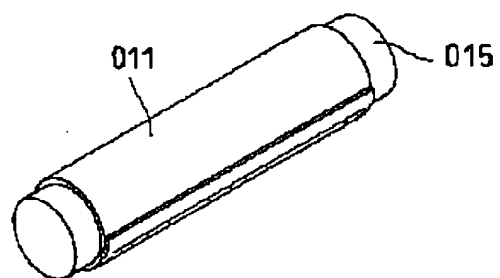
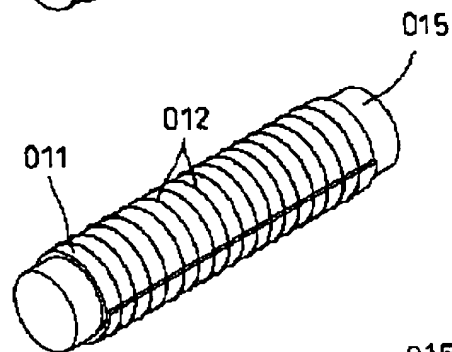


Fig 8

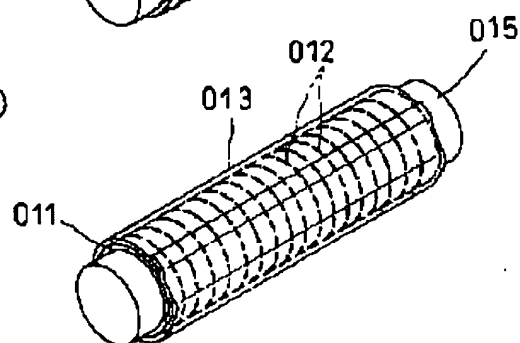
①



②



③



④

